



**NATIONAL UNIVERSITY OF ENGINEERING  
COLLEGE OF SCIENCES  
COMPUTER SCIENCE PROGRAM**

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**CC462 – CONCURRENT AND DISTRIBUTED SYSTEMS**

**I. GENERAL INFORMATION**

<b>CODE</b>	: CC461 – Concurrent and distributed systems
<b>SEMESTER</b>	: 8
<b>CREDITS</b>	: 4
<b>HOURS PER WEEK</b>	: 6 (Theory – Laboratory)
<b>PREREQUISITES</b>	: CC401 Programming of applications in networks
<b>CONDITION</b>	: Mandatory

**II. COURSE DESCRIPTION**

Know the basic elements of the design of distributed systems.  
Learn to install and use applications in distributed systems.

**III. LEARNING UNITS**

**1. Introduction to Distributed Systems**

- I: Objectives.
- II: Hardware and Software Concepts.
- III: Characteristics.
- IV: Design Aspects.

**2. Communication of Distributed Systems**

- I: Communications Stacks (Protocols with layers).
- II: Client / Server model

**3. The Client / Server model**

- I: Architecture.
- II: Customers and Servers.
- III: Platforms.
- IV: 2-Tier, 3-Tier, Multi-Tier Models.

**4. Support of the Operating System**

- I: Processes and Threads.
- II: Models

## **5. Middleware**

- I: Remote procedure call (RPC).
- II: Message-Oriented Middleware (MOM).
- III: Peer-to-Peer.
- IV: Directory service.
- V: Security

## **6. Distributed File Systems**

- I: Design.
- II: Implementation.
- III: Trends

## **7. Distributed Transactions and Concurrency Control**

- I: Synchronization.
- II: Mutual Exclusion.
- III: Atomic Transactions.
- IV: Locks in Distributed Systems

## **8. Distributed Objects - Component Models**

- I: Objects and Components.
- II: Benefits.
- III: Component Models

## **9. CORBA**

- I: Architecture.
- II: Metadata and Services.
- III: ORB and IDL.
- IV: CORBA IIOP.
- V: Implementations

## **10. COM**

- I: History.
- II: Architecture.
- III: Services.
- IV: Compound Documents and OCX / ActiveX.
- V: COM-CORBA integration.
- VI: Implementations

## **11. Enterprise Java Beans (EJB)**

- I: Architecture.
- II: Services.
- III: Components.
- IV: EJB and RMI.
- V: EJB-CORBA integration.
- VI: EJB-COM integration.

## VII: Implementations

### 12. Web Services

I: Architecture.

II: Services.

III: XML, UDDI, SOAP.

IV: .NET and J2EE implementations

### 13. Comparison between Component Models

I: Comparison CORBA, COM, EJB and Web Services.

II: Integration of architectures with Web Services (Microsoft.NET, Sun One, IBM).

## IV. BIBLIOGRAPHY

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- Reaz Hoque. Corba 3 developers guide - IDG Books, 1998.
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